

Appl. No. 10/798,677
Amdt. dated July 10, 2007
Reply to O.A. of April 10, 2007

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Remarks

I. Status of the Application

Claims 1-136 are pending and at issue in the present application.

The drawings have been objected to.

Claims 1-22, 54-73, and 95-110 stand rejected under 35 U.S.C. § 101 for claiming non-statutory subject matter. Claims 1-3, 5-7, 12-19, 21, 23-30, 32, 33, 39-42, 49, 50, 52, 54-56, 58, 59, 65-70, 72, 74-77, 79, 80, 86-93, 95, 96, 98-102, 108, and 109 stand rejected as obvious over Shechtman et al. (US 6524260, hereinafter "Shechtman") in view of Bova et al (US 6390982, hereinafter "Bova"). Claims 4, 8-11, 20, 22, 31, 34-38, 43-48, 51, 53, 57, 60-64, 71, 73, 78, 81-85, 94, 97, 103-105, and 110-136 stand rejected as obvious over Shechtman et al. in view of Bova et al., and further in view of various combinations of Ustuner (US 6746402), Sliwa, Jr. et al. (US 6511427, hereinafter "Sliwa"), Danisch (US 5321257), Walbrink et al. (US 5449356, hereinafter "Walbrink"), Magasi (US 4826492), and Touzawa et al. (US 2003/0198372, hereinafter "Touzawa").

II. Interview Summary

The undersigned thanks Examiner Chao for the courtesies extended during a telephonic interview conducted on July 5, 2007, between Examiner Chao and the undersigned during which the rejections of claims 1 and 3 and the disclosures of Shechtman, Bova, and Ustuner were discussed, and no agreement was reached. The following summarizes and amplifies the substance of the interview.

III. Response to Objections

Formal replacement drawings were filed in a separate paper April 19, 2007, in response to the objections in the pending Office action and within two months of the mailing date of the pending Office action as required therein. Therefore, withdrawal of the objection to the drawings is kindly requested.

IV. Amendments to the Specification

Paragraph [0017] of the specification has been amended to substitute the application serial number for the known identifying information provided at time of filing.

Paragraph [0024] has been amended to correct a typographical error.

No new matter has been added by these amendments.

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V. Specific Traversals of Rejections

Applicants traverse the rejection of claims 1-22, 54-73, and 95-110 under 35 U.S.C. § 101. Claims 1-22, 54-73, and 95-110 have been amended in accordance with the examiner's suggestion in the Office action to remove recitation of "finger mounted" in relation to the structure and pointer that are adapted to be mounted to a finger. Therefore, withdrawal of the rejections of claims 1-22, 54-73, and 95-110 under 35 U.S.C. § 101 is respectfully requested.

Applicants further traverse the rejections of claims 1-136 as obvious over any combination of Shechtman, Bova, Ustuner, Sliwa, Danisch, Walbrink, Magasi, or Touzawa.

Claim 1, and claims 2-23 dependent directly or indirectly thereon, recite a system for determining a global position of an anatomical structure of a patient's body. The system comprises a surgical navigation system, a substrate adapted to be removably mounted to an outer surface of a user's body, a sensor attached to the substrate that can be tracked by the surgical navigation system, a positional device attached to the substrate, a structure adapted to cover an end of a finger of the user, and a first circuit for calculating a global position of a point on the anatomical structure by correlating a position of the sensor and a position of the structure. The structure is movable in relation to the sensor. Further, the structure is capable of communicating a relative position of the structure with respect to the positional device with the positional device.

Claim 23, and claims 24-53 dependent directly or indirectly thereon, recite a method for determining a position of a point on an anatomical structure of a patient using a surgical navigation system. The method comprises the step of mounting a substrate in a removable manner to an outer surface of a user's body, wherein the substrate has a positional device and a sensor that can be detected by the surgical navigation system. The method further comprises the step of covering a fingertip of the user with a finger mounted structure. The finger mounted structure is movable in relation to the sensor and is capable of communicating a relative position of the finger mounted structure with respect to the positional device with the positional device. The method further comprises the steps of placing the finger mounted structure on the point of the anatomical structure to be determined, and determining the position of the point.

Claim 54, and claims 55-73 dependent directly or indirectly thereon, recite a system for

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determining a global position of an object. The system includes a navigation system, a substrate comprising a glove adapted to be mounted to an outer surface of a user's body, a sensor attached to the substrate that can be tracked by the navigation system, a positional device attached to the substrate, and a structure mounted to a finger of the glove. The structure communicates a position of the structure in relation to the positional device directly to the positional device. The system further includes a first circuit for calculating a global position of a point on the object by correlating a position of the sensor and a position of the structure.

Claim 74, and claims 75-94 dependent directly or indirectly thereon, recite a method for determining a position of a point on an object using a navigation system. The method comprises the steps of mounting a glove on a user's hand. The glove has a positional device and a sensor that can be detected by the surgical navigation system. The method further comprises the steps of disposing a finger mounted structure on a finger of the user capable of communicating with the positional device, placing the finger mounted structure on the point of the object to be determined, and determining the position of the point.

Claim 95, and claims 96-110 dependent directly or indirectly thereon, recite an apparatus for determining a position of a point on an anatomical structure. The apparatus includes a glove, a sensor and a positional device attached to the glove, and a structure capable of communicating with the positional device and adapted to be mounted on a finger of the user.

Claim 111, and claims 112-136 dependent directly or indirectly thereon, recite a method for determining a position of a point on an anatomical structure through a small incision opening using a surgical navigation system, wherein the point is obstructed from the incision. The method comprises the step of covering a tip of a user's finger with a finger mounted pointer having a rigid tip. The finger mounted pointer is capable of communicating with an external positional device mounted on a substrate in moving proximity to the incision opening, and the external positional device is associated with a sensor mounted on the substrate that can be detected by the surgical navigation system. The method further comprises the steps of manipulating the finger mounted pointer so that the rigid tip is in contact with the point to be determined, determining the relative position of the finger mounted pointer in relation to the sensor, determining the global position of the sensor, and determining the global position of the point from the relative position of the finger mounted pointer

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and the global position of the sensor.

The applied references do not disclose or suggest a system as recited in claims 1-22, including a substrate adapted to be removably mounted to an outer surface of a user's body, a sensor attached to the substrate that can be tracked by the surgical navigation system, a positional device attached to the substrate, a structure adapted to cover an end of a finger of the user, and a first circuit for calculating a global position of a point on the anatomical structure by correlating a position of the sensor and a position of the structure, wherein the structure is movable in relation to the sensor, and wherein the structure is capable of communicating a relative position of the structure with respect to the positional device with the positional device.

Further, the applied references do not disclose or suggest a method for determining a position of a point on an anatomical structure of a patient using a surgical navigation system, as recited in claims 23-53, including the steps of mounting a substrate in a removable manner to an outer surface of a user's body, wherein the substrate has a positional device and a sensor that can be detected by the surgical navigation system, covering a fingertip of the user with a finger mounted structure, wherein the finger mounted structure is movable in relation to the sensor and is capable of communicating a relative position of the finger mounted structure with respect to the positional device with the positional device, placing the finger mounted structure on the point of the anatomical structure to be determined, and determining the position of the point.

Further still, the applied references do not disclose or suggest a system for determining a global position of an object, as recited in claims 54-73, wherein the system includes a navigation system, a substrate comprising a glove, a sensor attached to the substrate that can be tracked by the navigation system, a positional device attached to the substrate, and a structure mounted to a finger of the glove, wherein the structure communicates a position of the structure in relation to the positional device directly to the positional device, and further including a circuit for calculating a global position of a point on the object by correlating a position of the sensor and a position of the structure.

Yet further, the applied references do not disclose or suggest a method for determining a position of a point, as recited in claims 74-94, including the steps of mounting a glove on a user's hand, wherein the glove has a positional device and a sensor that can be detected by the surgical

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navigation system, disposing a finger mounted structure on a finger of the user capable of communicating with the positional device, placing the finger mounted structure on the point of the object to be determined, and determining the position of the point.

Furthermore, the applied references do not disclose or suggest an apparatus as recited in claims 95-110, including a glove, a sensor and a positional device attached to the glove, and a structure capable of communicating with the positional device and adapted to be mounted on a finger of the user.

Additionally, the applied references do not disclose or suggest a method for determining a position of a point on an anatomical structure through a small incision opening, as recited in claims 111-136, including the steps of covering a tip of a user's finger with a finger mounted pointer having a rigid tip, wherein the finger mounted pointer is capable of communicating with an external positional device mounted on a substrate in moving proximity to the incision opening, and the external positional device is associated with a sensor mounted on the substrate that can be detected by the surgical navigation system, manipulating the finger mounted pointer so that the rigid tip is in contact with the point to be determined, determining the relative position of the finger mounted pointer in relation to the sensor, determining the global position of the sensor, and determining the global position of the point from the relative position of the finger mounted pointer and the global position of the sensor.

Rather, Shechtman discloses at FIG. 4 a reference sensor 32 that is "attached to [the patient's] body at a fixed and known location with respect to a predetermined reference point of the spine 34." Column 6, lines 45-47. The reference sensor 32 may be a magnetic field generator that serves as a reference with respect to a probe 30, which is only shown in FIG. 4 as a non-descript black rectangle located on the first distal joint of the user's finger. No additional relevant description regarding the probe 30 is disclosed. However, Shechtman also discloses a rigid probe 2 that is "constructed such that when it is grasped by a user's hand, the outer tip of the index finger of the user's hand is at a predetermined position with respect to a position sensor carried by the probe." Column 4, lines 58-61. Shechtman discloses that a position on a patient may be located using a single tracking system that tracks the position of the sensor on the probe and subsequently calculates the predetermined positional offset between the sensor and the tip of the user's finger.

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It would not have been obvious to modify Shechtman to place the reference sensor on a user's body rather than a patient's body because Shechtman specifically teaches away from placing the reference sensor 32 on the user's body rather than on the patient's body by requiring the "fixed and known" positional relationship between the reference sensor and the patient's spine.

Bova discloses a surgical navigation system that tracks a position reference device 14 attached to an ultrasound probe 16 using an infrared camera system that tracks the position of LED's on the position reference device 14.

Ustuner discloses an ultrasound transducer with a contact sensor disposed on a finger of a glove. The transducer is connected to a display that displays output from the probe.

Danisch is not applicable prior art to the invention of the present application because Danisch is non-analogous art. Specifically, Danisch discloses a fiber optic bending and positioning sensor used to measure deflections of structural beams that are too small to be effectively measured by strain gauges. See, e.g., column 2 line 36-column 3, line 10. There would be no reason for a person of ordinary skill in the medical navigation art to explore the field of strain gauges used in the field of civil engineering to measure very small deflections. Further, Danisch actually teaches away from uses as disclosed in the present application. Danisch suggests that the fiber optic sensor is most useful for detecting extremely small movements, which teaches away from use as, for example, a location sensor on a hand- or finger-mounted device, which experiences large movements in comparison to the small deflections being measured in the structural beams disclosed by Danisch.

The remaining applied references do not overcome the deficiencies identified above. Therefore, claims 1-136 are not obvious over the applied references, and the rejections thereover should be withdrawn, notice of which is respectfully requested.

VI. Conclusion

For the foregoing reasons, it is believed that all of the claims at issue are in condition for immediate allowance, notice of which is requested.

If there are any issues remaining that can be resolved by telephone, the examiner is invited to call the undersigned.

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VII. Deposit Account Authorization

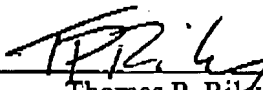
The Commissioner is hereby authorized to charge any deficiency in any amount enclosed or any additional fees which may be required during the pendency of this application under 37 CFR 1.16 or 1.17, except issue fees, to Deposit Account No. 50-1903.

Respectfully submitted,

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July 10, 2007

By:


Thomas P. Riley
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